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work and life.

Direct Reading Instruments and OSHA

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DREAM Workshop

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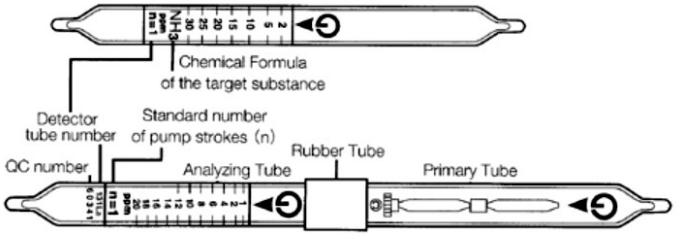
OSHA Occupational Safety and Health Administration

Commercial manufactures and products mentioned in this presentation are for descriptive use only and do not constitute endorsements by USDOL-OSHA

OSHA Occupational Safety and Health Administration

Historical use of direct reading instruments

- Noise dosimeters
- Heat Stress
- Colorimetric tubes
- Ecolyzer



A closeup of Gastec gas detector tube(s)

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Direct reading instruments for permit required confined space entry

- **"permit-required confined space"**
  - describes a confined space that among other characteristics: contains or has the potential to contain a hazardous atmosphere.

- **1910.146(c)(5)(ii)(C)** Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order.

- **1910.146(c)(5)(ii)(F)** The atmosphere within the space shall be periodically tested as necessary …

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Types of Gases or Vapors OSHA wants to measure

- Oxygen
- Flammable
- Toxic - PELs

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Direct Reading Instruments for exposure monitoring - regulations

- 1910.1028, Benzene, Appendix D, Sampling and analytical methods for Benzene monitoring and measurement procedures
  - Sampling and analysis may also be performed by portable direct reading instruments, real-time continuous monitoring systems, passive dosimeters or other suitable methods. The employer has the obligation of selecting a monitoring method which meets the accuracy and precision requirements of the standard under his unique field conditions. The standard requires that the method of monitoring must have an accuracy, to a 95 percent confidence level, of not less than plus or minus 25 percent for concentrations of benzene greater than or equal to 0.5 ppm.

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Equipment Evaluation Considerations

- Check Manufacture Specifications
- Cost considerations
  - upfront and recurring
- Testing/Evaluation
  - Operational, Environmental, Electromagnetic Susceptibility
- Servicing and quality
- User friendliness

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- OSHA Salt Lake Technical Center is home to the Agency's :
  - Analytical Services
  - Sampling and Analytical Methods Development
- Regarding exposure assessment - integrated sampling with laboratory analysis has been the gold standard for OSHA

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Integrated Sampling and Analytical Methods Development

Evaluation Guidelines For Air Sampling Methods Utilizing Chromatographic Analysis

47 pages

Evaluation Guidelines for Air Sampling Methods Utilizing Spectroscopic Analysis

39 pages

- Target Concentrations
- Reliable Quantitation Limit (RQL)
- Reproducibility
- Sampling Rate and Capacity
- Extraction Efficiency
- Detection Limit
- Determination of the Precision
- Interferences
- Retention Efficiency
- Effects of Storage

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Written reports fall into three basic categories:

- ***Evaluated Methods*** - methodology that has been thoroughly evaluated according to the guidelines.
- ***Partially Evaluated Methods*** - procedures for which an in-depth evaluation has not been performed. Often performed rapidly to meet immediate need of field personnel.
- ***Studies*** - Investigations that involve a class or group of analytes, or an aspect of methodology that may be common to many methods in general. Unsuccessful evaluations will be reported as studies.

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SLTC Direct reading methods

- **1993 - SLTC evaluated the Draeger 190 – CO monitor.**

- OSHA ID-209
  - CARBON MONOXIDE IN WORKPLACE ATMOSPHERES

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Portable Field Instruments

Evaluation Guidelines, with Testing and Reporting Protocols for OSHA On-site Air and Surface Sampling Methods

35 pages

- Target Concentrations
- Linearity of Response
- Response time
- Uncertainty (precision and bias)
- Detection Limit
- Interferences (water vapor)
- Face velocity effects
- Interferences

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Future of Direct Reading Gas and Vapor Instruments

- Market forces (demand)
- OSHA's willinginess to support "Cite on Site"
- Screening versus Compliance
- Safety and Health Management Systems

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